CLEMSON UNIVERSITY

CHEMICAL ENGINEERING

Spring 2002

Charting A Path to the Top 20

The university's recently announced goal of moving into the ranks of the nation's Top 20 public universities presents a new challenge for every department on campus. For Chemical Engineering, the emphasis on investment in three key areas (people and programs, infrastructure, and facilities) means that we will be examining every aspect of our work for potential improvement. Our primary goals in this venture are as follows:

- Maintain a top undergraduate program.
- Establish a top graduate program
- Continue to increase research funding and visibility

The undergraduate curriculum has just been revised to provide our students with even better tools for entering the profession. We are incorporating multidisciplinary courses at both undergraduate and graduate levels and seeking opportunities for international experience for students. We are also increasing the number of undergraduate students engaged in research and in co-operative education. Our undergraduates are highly competitive and are able to be selective in their employment decisions or their choice of graduate programs.

The graduate program is being strengthened in several ways -- with the addition of two new faculty members with research interests in bioengineering, with aggressive recruiting of U.S. students, and with the push to improve faculty research and publication rates and a concerted effort to improve our Ph.D. graduation rate.

The faculty research funding rate has improved significantly and continues upward. As publication rates, Ph.D. graduation rates and research funding improve, the program will gain greater visibility and, in turn, greater viability among our peers.

"Chemical Engineering is moving forward even without the overall institutional mission, but the goal of President Barker and the Board of Trustees has given greater import to the department's efforts," said **Department Chair Jim Goodwin**. "As our activities become more visible and accountability becomes more public, we intend to be successful in meeting these new challenges. And we will be looking to our alumni, friends and other constituents to guide us."

NSF Extends CAEFF Funding

The Center for Advanced Engineering Fibers and Films (CAEFF) recently received its fifth year of funding from the National Science Foundation (NSF), with $3.2 million in support for the 2002-03 budget year.

CAEFF co-sponsored PPS 18 (the Eighteenth Annual Meeting of the Polymer Processing Society) in Guimarães, Portugal, in July. NSF co-sponsored the conference based on a proposal developed by **Dr. Dan Edie** and CAEFF Administrative Director Jane Jacobi. **Dr. Amod Ogale** presented a paper at the meeting, "Online Measurements of Microstructure in Blown Film Extrusion of a Linear Low-Density Polyethylene," co-authored with Srinivas Cherukupalli, a Ph.D. student in the Department, and Professors Anthony McHugh and Lars Henrichsen of University of Illinois.

The Center is also cosponsoring a workshop, "Advanced Carbon Materials" September 12-13 in Cheju, Korea. Drs. Dan Edie and Amod Ogale will be presenting invited papers at this event. Edie's paper is "Future Directions in Carbon Research;" Ogale's is "New Technologies for Stabilizing Carbon Fibers and Composites." In addition, graduate Nidia Gallego will present a paper titled "Carbon Foams for Thermal Applications."

New Faculty Hired

Two new faculty members will join the department for the coming academic year.

Associate Professor Sarah W. Harcum, who makes history as the first woman to be appointed to a full-time tenure-track faculty position in the department, received her Ph.D. from the University of Maryland. Her research specialty is bioengineering/protein engineering. Prior to coming to Clemson, she was an associate professor of Chemical Engineering at New Mexico State University.

Assistant Professor Andrew T. Metters received his Ph.D. from the University of Colorado and is currently on a post-doctoral fellowship at the Swiss Federal Technical Institute in Zurich. His research specialty is bioengineering/polymers.

Sarah and Andrew bring new expertise to the department, and you will be hearing more about their work in coming issues.

Advisory Board Reviews Department Progress

The department's Professional Advisory Board met in February to review departmental activities and offer recommendations for improvement.

The board noted significant progress overall, with special emphasis on the increase in faculty funded research, the strength of the undergraduate program, and alignment of the department with strategic goals of the College of Engineering and Science and the university overall.

Among their recommendations:

- Strengthen graduate student recruitment initiatives
- Strengthen undergraduate curriculum with emphasis on problem solving tools and oral communication skills
- Address infrastructure concerns, especially computer access and technical services
- Improve alumni network and fundraising strategies

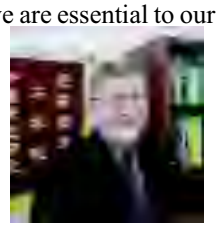
Faculty/Staff News

A NOTE FROM THE CHAIR

Clemson in the Top 20 public universities: It's a somewhat daunting prospect to consider and one that will not happen overnight. President Barker has envisioned a 10-year period in which to reach this goal, and there will be much work to be done before we are there. However, we agree that it is an *achievable* goal. In Chemical Engineering, we are constantly evaluating our program for its effectiveness, its value to students, the various professions in which chemical engineers work, and of course the society we serve. The Top 20 goal is one that excites and inspires us while making us look carefully at how our program fits into the "roadmap." We will be asking students, faculty, staff, alumni, our advisory board, industry contacts -- indeed all our constituencies -- for guidance in the role we will play. The faculty and staff are working as hard as they make the students work. (Alumni will probably remember how hard this was. There is a reason why ChE is viewed as probably the hardest major at Clemson.)

Such a major undertaking will not be accomplished overnight, and it will not be accomplished without sacrifice and commitment. Sacrifice? Some of us will have to sacrifice personal time in order to improve our research and publication efforts. Some of us will have to sacrifice space we had hoped to use for one purpose so that it can be redirected to another use more in line with the Top 20 initiative. (Students will NOT have to sacrifice the quality of the undergraduate and graduate programs; quality -- indeed improving the quality of our programs -- will continue to be our first priority.) Commitment? It will take the resolve of the entire department -- faculty, staff, students, alumni and even our friends in industry and beyond -- to move our program forward to the level required.

The goal is set, and we know what needs to be done to achieve it in our department. Two crucial meetings over the course of the past few months have helped the department articulate and hone our objectives and our strategies for achieving them. The first, a meeting in which the dean, the provost and vice presidents met with all faculty and staff in the department, was especially important in helping us communicate internally about what the department needs to move into the top-ranked programs. The other, a two-day session with the Professional Advisory Board, gave us valuable input from leading professionals in the field, including faculty and administrators from other top-tier chemical engineering departments as well as executive-level decision makers from across the spectrum of the fields served by our profession. We have begun to take action on their recommendations and to implement the strategies we believe are essential to our success. We invite you to join us on this exciting journey.



James G. Goodwin, Jr.
Class of '67

Associate Professor Michael Kilbey received the Murray Stokely Award for Excellence in Teaching, presented at the College's Honors and Awards ceremony by Dean of Engineering and Science Tom Keinath.

CU Catalysis Faculty Organize New Regional Society

Three members of the Chem E faculty whose work is in the area of catalysis were instrumental in organizing the first meeting of the Southeastern Catalysis Society, held in Clemson May 5 and 6. **Professors Jim Goodwin**, **Bud Rice** and **David Bruce** planned the meeting that attracted about 45 faculty members, students and industry professionals from the Southeastern states.

Officers were elected and include Dr. Jim Goodwin, president; Dr. Bob Davis, University of Virginia, president-elect; Dr. Henry Lamb, North Carolina State, secretary; Dr. Bud Rice, treasurer; and Dr. Jerry Spivey, North Carolina State, liaison director.

The next meeting will be held in Asheville, NC, this fall. If you work in catalysis and are interested in joining, contact Dr. Goodwin.

Thies appointed to CARBON Honorary Editorial Board

Professor Mark Thies has been invited by the editors of CARBON Magazine to serve as a member of the publication's honorary editorial board. The editors of CARBON were looking for "a core of dedicated reviewers who are prepared to reject manuscripts which are not up to standard, and will provide constructively critical evaluations of those deemed worthy of publication."

"I am very pleased to accept CARBON's invitation," Thies said. "The quality of our professional publications should be a priority for all of us, and I am glad to contribute my time and attention to maintaining the editorial values for which CARBON is recognized."

Faculty

Charles H. Barron, Jr., D.Sc.
Polymer Reaction Engineering

David A. Bruce, Ph.D.
Catalysis, Kinetics, Molecular Sieve Synthesis, and Molecular Modeling

Dan D. Edie, Ph.D.
Director, Center for Advanced Engineering Fibers & Films
Composite Materials, High-performance Fibers, Polymer Processing & Rheology

Charles H. Gooding, Ph.D.
Membrane Separation Processes

James G. Goodwin, Ph.D.
Department Chair
Heterogeneous Catalysis, Kinetic Analysis of Surface Reactions, Characterization of Catalysts

Sarah W. Harcum, Ph.D.
Bioengineering; Protein Production

Graham M. Harrison, Ph.D.
Fluid Mechanics & Non-Newtonian Flow

Douglas E. Hirt, Ph.D.
Polymer Films

Scott M. Husson, Ph.D.
Bioseparations and Separation Materials Synthesis

S. Michael Kilbey, Ph.D.
Polymer Science; Surface Modification via Self-Assembly

Stephen S. Melsheimer, Ph.D.
Automatic Control of Process Systems
Associate Dean, Engineering & Sciences

Andrew T. Metters, Ph.D.
Bioengineering; Polymer Science

Amod A. Ogale, Ph.D.
Experimental & Modeling Issues Related to Fibers, Films & Composites

Richard W. Rice, Ph.D.
Catalysis, Kinetics, & Chemical Reactors

Mark C. Thies, Ph.D.
Thermodynamic and Supercritical Fluids

Harrison Directs REU in Novel Materials

Assistant Professor Graham Harrison received a National Science Foundation grant to conduct a summer Research Experience for Undergraduates (REU) program in novel materials. Eight students are participating in this summer's session which features research topics in Synthesis and Modeling of Novel Mesoporous Materials, with Associate Professor David Bruce; Metal-Support Compound Formation in Supported Metal Catalysts, with Professor James G. Goodwin, Jr.; Rheology of Filled Polymers Materials, with Assistant Professor Graham Harrison; Surface Properties of Films, with Associate Professor Doug Hirt; Rational Design of Bio-Inspired Materials by Computer Simulation, Fabrication of Bio-Inspired Materials by Molecular Templating, with Assistant Professor Scot Husson; and Thermal Processing and Characterization of Films Derived from Soy-Based Biopolymers, with Professor Amod Ogale. Students participating in the program are from the College of Charleston, South Carolina State University, Norfolk State University, and Clemson.

Ogale Receives Fellowship to University of Mumbai

Professor Amod Ogale has been selected to receive the Professor. B. D. Tilak Visiting Fellowship at the University Department of Chemical Technology (UDCT), University of Mumbai, India, for his contributions to polymer engineering. He will present seminars and lectures when he visits UDCT in December 2002. Prof. Ogale currently serves as the Departmental Graduate Coordinator and a Topic Leader in the Center for Advanced Engineering Fibers and Films.

Dow Chemical Professor of Chemical Engineering Dan Edie is stepping down as director of the Center for Advanced Engineering Fibers and Films. He will return as a full-time member of the Chemical Engineering faculty, continuing his research with the Center.

FACULTY FACTOIDS*

As an undergraduate student at Clemson,
Charles Barron completed an English course every semester.

**Little-known tidbits of TOTALLY USELESS information about the Chem E faculty.*

Professor Charles Barron "officially" retired at the end of the spring semester but will continue to teach design and other courses part-time as Professor Emeritus.

Student News

Student Awards

Sonia Hammache received the College of Engineering and Science Outstanding Graduate Researcher Award, presented by Dean Tom Keinath. Sonia has successfully completed her Ph.D. work and will graduate in December.

Liwen Jin received the Department of Chemical Engineering Teaching Assistant Award.

New Co-op Schedule Begins This Fall

The co-op experience has been an important part of the Clemson BSChE program since the mid 1970s. Currently more than half of our students participate in the program, and most who do report that they gain a rich professional experience as well as competitive advantage in the classroom and the senior year job market. To ensure a stronger foundation for students when they enter the ChE co-op program and a richer experience overall, the department has made some modifications to our co-op structure that will take effect this fall.

"In the new co-op sequences, students will be better prepared in each work session for engineering experiences that are progressively more meaningful and productive," said **Professor Charles Gooding**, who coordinates the department's co-op program.

There now will be two recommended entry points into the Chemical Engineering co-op program. The first follows the spring semester of the sophomore year, just after the student completes ChE 211, the mass and energy balance course. The alternative entry point begins in the summer after the sophomore year, allowing students to add Thermo I and Fluids to their knowledge base before they report to work. ChE students can enter the co-op program as late as the spring semester of their junior year and still complete three work sessions to earn a co-op certificate along with their BS degree in five years total. Students who enter during or after the sophomore year can complete four co-op work sessions and graduate in five years total.

Chem E's Perfect Man

John Perry, pictured here with his proud family at the department's commencement luncheon, joins an elite group of Chem E graduates (he's only the ninth since the department began keeping records) to earn a perfect 4.0 gpa. John, who received many academic honors during his undergraduate career, most recently a prestigious Goldwater Scholarship, will begin graduate study for a doctorate in chemical engineering at Georgia Tech in the fall.

AIChE Members Travel to Puerto Rico Conference

Fifteen Chem E undergraduate students, along with **Dr. David Bruce**, traveled to San Juan, Puerto Rico in March for the AIChE Southern Regional Student Conference. "The students had a lot of fun, of course, but they also had the opportunity to visit a number of pharmaceutical manufacturing facilities and learn about the role chemical engineers play in that profession," Bruce said.

A Day to Remember

Spring Commencement was already scheduled to be memorable. For the first time in a very long while, the program was to be held outdoors, in Clemson Memorial Stadium (aka Death Valley) instead of in the usual location in Littlejohn Coliseum, due to renovations at Littlejohn. Event planners decided to proceed with the stadium location "rain or shine," hoping that Mother Nature would not have the audacity to allow weather to dampen this most joyous occasion for students and their families.

Wrong! Clouds gathered on the horizon just as the 11 a.m. ceremony was getting under way. The Clemson spirit persevered despite thunder, lightning and rain, until just before the Engineering undergraduates were scheduled to walk. Provost Dori Helms made the necessary call to cancel, and a group of wet, disappointed Chem E graduates and their families made their way to Earle Hall, where the traditional buffet luncheon was waiting.

The celebration would not be denied, however. Students had been instructed to pick up their diplomas , unceremoniously, in the concession area underneath the stands. A few picked them up, but most headed for Earle Hall. **Professor Charles Barron** braved the weather, walked down to the stadium and returned to the department with the remaining Chem E diplomas. An impromptu, slightly damp but we like to think meaningful ceremony was held in the lobby so that our graduates would not be cheated out of a very special moment. (See commencement/reception photos in the Chem E photo album on the opposite page.)

Bookmark our website for updates: http://www.ces.clemson.edu/chemeng

Chem E Family Album

Alumni News

Webster '42 Establishes New Endowment for Department

Francis Webster, a retired vice president with the 3M Corporation, has established an unrestricted $25,000 endowment to the department. A Chem E graduate of the class of 1942, Webster resides in Hilton Head.

"We are very grateful for Mr. Webster's generous support," said Department Chair Jim Goodwin. "This type of gift is especially valuable to us as we work toward Top 20 status because it allows us to direct the funds to target those areas where we have critical needs. I would like to take this opportunity to thank him publicly and to emphasize to all our faculty, staff, students, alumni and friends in industry how important his gift will be in helping us move forward."

Newest Ph.D. Alum

Our congratulations to **Dr. Shilpa Sankhe** '02, who received her doctorate in May. Shown here with her advisor, **Dr. Douglas Hirt**, Shilpa has accepted a position as a product development engineer with American Profol, Inc., in Cedar Rapids, Iowa. Her doctoral dissertation is *Erucamide Migration in Multilayer Polyolefin Films Using Synchrotron-Based FTIR Microspectroscopy.*

Chris Luca '01 Wins Amazing Race 2

Recognize the guy on the right in the photo? You might if you've spent any time in Earle Hall in the past few years. **Chris Luca**, who just graduated last May, teamed up with his lifelong buddy, Alex, for the adventure of a lifetime as they competed for $1 million dollars in THE AMAZING RACE 2, which premiered Monday, March 11 at 10 p.m. on CBS, then moved to its regular time period of Wednesdays at 9 p.m. Following their progress made for an entertaining few weeks, and when they WON, the faculty took credit for helping Chris hone all those Chem E skills he used in the competition -- you know, analytical thinking, problem solving, strategizing, teamwork....

Congratulations, Chris and Alex!

Photo: Tony Esparza/CBS

In the Mail

Dear CU Chem E . . .
I have started my own business, Optimize Consulting, Inc. My first customer is a small petroleum refining company, Petrola Hellas S.A., located in Athens, Greece. The company has one refinery located in Elefsina, just west of Athens. I am helping the refinery transition from a simple topping refinery that makes a lot of low-valued fuel oil to a much more complex one making high-valued lubricants as well as more diesel fuel meeting the EU 2005 specifications for sulfur content. I am transferring my knowledge and experience with advanced computing systems to the engineers and operators in the refinery so that they can operate the new, complex equipment under construction safely and efficiently. I have the title of Business Systems Optimization Manager. The job will last for the next 3 to 5 years -- hopefully through the 2004 Olympic Games scheduled to take place here in Athens.

Sincerely,
Suzanne D. Roat '85

Attention Alumni!
Send us your news.
We'll print it as space allows.

Check out the Alumni page on our website, www.ces.clemson.edu/chemeng

Chemical Engineering Top 20 Roadmap Puts Everyone in the Driver's Seat

In other locations in this newsletter, we have outlined the role Chemical Engineering will play in moving Clemson into the Top 20 public universities in the United States. We have discussed the various resources that will be needed for this department to fulfill its role in reaching this challenging but achievable goal. The following details our department's individual "roadmap" for getting there, based on the university's overall plan and close analysis of our strengths and current position among our peers. Please note the dollar amounts in parentheses. These indicate the known "pricetags" associated with these specific goals.

1. A national-calibre faculty

- Endowed chair ($250,000-$3,000,000)
- Named Professorships ($500,000)

2. National recognition for excellence in science and engineering education

- Develop strong, innovative curricula and programs
  - Undergraduate curriculum strengths
  - Co-op results
  - Summer REU
  - International experience for undergraduates
- Recruit and train top-quality students
- Create a state of the art education environment
  - Named laboratories ($250,000)
  - Named lecture hall ($50,000)
  - Named classroom ($50,000)
  - Integrate technology into the curriculum

3. National stature in research and scholarship

- Exceed current Top 20 extramural funding expenditures for faculty
- Exceed current Top 20 threshold for scholarly publications by faculty (refereed journal articles plus reviewed conference proceedings)
- Increase Ph.D. student/faculty ratio and Ph.D. graduation rate
- Foster innovation through collaboration across departmental, college and university boundaries

4. National leadership in industry and university partnerships

- Expand the scope of industry-supported programs and centers
- Serve the lifelong learning needs of industry and professionals

As you can see, only a few of our goals have specific dollar amounts indicated. In most cases, with ongoing programs and long-terms goals, there is no budget. **Instead there is an ongoing need for funding.** President Barker believes -- and we join him enthusiastically -- that Top 20 status is possible for Clemson. We also join him in believing that it will not happen overnight and it will require significant funding. We will keep you informed of our progress and our needs. ***Please consider how you might help us reach this important destination. A self-mailing flyer is enclosed for your immediate consideration.***

Please make your check payable to:
Clemson University Foundation
and write
Chemical Engineering
on the for line at the bottom of the check.
Thank you in advance for your support.

A Final Note

Chem E Fall Calendar

Sept. 5 Graduate Seminar begins
2 p.m. Room 100, Earle Hall
Meets each Thursday; see detailed schedule on our website

Sept. 14 Football vs. Georgia Tech
Time TBA
ACES BBQ 2 hrs. before game

Oct. 19 Football vs. Wake Forest
Death Valley Stadium (Homecoming)
Chem E Alumni reception in Earle Hall before or after the game, depending on start time; check our website close to game date

We hope you'll join us this fall for one or all of the events listed on the departmental calendar at left.. For more details, check the department's web site, www.ces.clemson.edu/chemeng. While you're on campus, stop by the South Carolina Botanical Garden and explore "Spittin' Image," a nature-based sculpture designed by Patrick Dougherty. As always, you have a standing invitation to stop by and visit with our faculty, staff and students. You remain always a member of the ChE family.

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